“Interrelations between transparency of local authorities and corruption: Evidence from municipal surveys in Ukrainian regional cities”

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INTERRELATIONS BETWEEN TRANSPARENCY OF LOCAL AUTHORITIES AND CORRUPTION: EVIDENCE FROM MUNICIPAL SURVEYS IN UKRAINIAN REGIONAL CITIES

Abstract

Considering Ukraine's corruption scandals at all levels of public governance, combating corruption and enhancing transparency have become a pivotal factor in maintaining the trust of Ukrainian citizens and foreign partners in central and local authorities. It is also an essential prerequisite for Ukraine's prospective membership in the EU and the allocation of financial assistance from external donors. The study aims to examine how transparency in local governance influences the level of corruption in regional cities of Ukraine. The paper examines how transparency in local authorities relates to different types of corruption, including bribery within municipal services, healthcare, and other public sectors. Utilizing panel data from 24 Ukrainian cities collected between 2017 and 2020 (all-Ukrainian sociological municipal survey and project 'Transparent, Financially Sound and Competitive Local Governments in Ukraine'), the study employs both random and fixed-effects panel regression analyses to assess the impact of various governance indicators on corruption levels across different sectors, including municipal services, healthcare, and education. The findings suggest that higher transparency of the local authorities is generally associated with lower levels of bribery in the housing and communal services sector (estimation coefficient = –0.204226), in registration and licensing institutions (–0.5353756), in healthcare institutions (–0.2032171), and experience of bribing local authorities (–0.2505674). The analysis concludes that enhancing transparency may significantly reduce corrupt practices within local government operations, thereby strengthening public trust and bringing Ukraine closer to meeting European Union standards.

Keywords transparency, corruption, bribery, local authorities, municipal survey, random and fixed effect panel regression

JEL Classification D73, H70, H83, C23

INTRODUCTION

Corruption is a significant barrier to Ukraine's socio-economic stability and EU integration, despite major anti-corruption and governance reforms since the 2014 Revolution of Dignity. Central to these reforms was decentralization, which empowered local governments and established over 1,400 "amalgamated territorial communities" (hromadas) by 2021, improving local governance and accountability (Portal "Decentralization", n.d.). Public trust in local authorities, crucial in countries like Ukraine, is closely linked to transparency. Studies by the World Bank (2017) and Transparency International (2021) show that access to government information boosts accountability and trust, while transparency initiatives across Eastern Europe, including Ukraine, have gradually increased public confidence.

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Despite these efforts, corruption at the local level remains entrenched. In the 2023 Corruption Perceptions Index, Ukraine ranked 104th, indicating ongoing issues with bribery and favoritism (Transparency International, 2023). In response to EU and IMF pressures, Ukraine has introduced key anti-corruption bodies like NABU, SAPO, and NACP, along with reforms such as the e-declaration system, enhancing transparency. NABU frequently reports on local corruption cases, emphasizing issues in sectors like procurement and healthcare (NABU, 2021). The IMF's Extended Fund Facility further requires Ukraine to improve public procurement and local budget transparency to support broader governance goals (IMF, 2024; Zolotova et al., 2023).

In Ukraine, concerns about corruption and a lack of transparency in local authorities gained significant attention, accompanied by many public scandals. These include numerous cases of the payment of inflated prices for essential goods during the tenders, with the influence of vested interests; the misdirection of humanitarian aid provided by international partners during the COVID-19 pandemic; corruption schemes with the distribution of money allocated to build infrastructure, etc.

In many Ukrainian cities, there is a lack of transparent reporting on utilizing financial resources and an absence of productive mechanisms for public oversight. This creates a conducive environment for the abuse of power and opportunities for corruption (INEKO & ICPS, n.d.). Civil society organizations (CSOs) and activists have intensified their efforts to pressure local authorities and the government to implement reforms that could enhance transparency. For instance, groups like the Anti-Corruption Action Centre and Transparency International Ukraine have actively lobbied for laws requiring government officials to declare assets and public procurement reforms. Ukrainian CSOs have launched several campaigns to increase public awareness and hold local governments accountable. Initiatives like the "Dozorro" monitoring platform, led by civil society actors, allow citizens to report suspicious procurement activities, highlighting potential misconduct. The involvement of citizens in monitoring government activities has been a driving force in maintaining pressure on local and national authorities to adopt transparent practices and curb corruption.

Ukraine faces growing data from surveys and rankings of transparency like "Transparency and financial health of the 50 largest cities and 24 regions" and the annual "The All-Ukrainian Sociological Municipal Survey." Thus, comparative studies across cities with varying transparency levels and different citizen opinions about the authorities' corruption level establishing a link between transparency and reduced corruption in Ukraine's local governance might support strategies to boost information access, strengthen accountability, and engage citizens.

1. LITERATURE REVIEW

Corruption is complex and influenced by unpredictable factors like political and regulatory shifts. New relationships, connections, and interdependencies are constantly forming, which is a defining characteristic of quantum economics. Corruption often manifests in forms that are difficult to predict, as it depends on many factors, including the political situation, regulatory changes, and human behavior. Quantum economics, incorporating principles of uncertainty, offers insights into corruption's nuances (Holtfort & Horsch, 2024; Njegovanović, 2023). Regulatory quality, public wages, and economic openness impact corruption levels (Linhartová & Halásková, 2022), while trade openness and net foreign direct investment inflows correlate positively with government stability, bureaucracy, and law and order (Němečková & Hayat, 2022). Additionally, corruption significantly influences trade efficiency in developing countries (Acar & Kara, 2023; Melnyk et al., 2022).

The fight against corruption is not limited to a specific sector; it influences all aspects of society. However, it demands comprehensive institutional reforms that can ultimately shift public attitudes. Achieving zero tolerance for corruption is essential to establishing new behavioral standards for civil servants and restoring trust

in state institutions. Organizational citizenship behavior mediates positive impacts of public service transparency (Jiartana et al., 2023). Rouillé (2024) shows that norms can effectively promote prosocial behavior, which is extremely important in cases of corruption, and Polishchuk et al. (2023) underscore that altering behavior necessitates the active participation of institutions, specifically through the establishment of transparent and high-quality services.

Research links corruption closely to money laundering and suggests that regulatory and social factors drive illicit trends more than economic factors in developed nations (Bartulovic et al., 2023). Yarovenko et al. (2024) prove that social and regulatory factors have a more significant impact on the trends of illicit practices in developed countries than economic and digital factors. Digitalization, e.g. blockchain, holds potential for improving struggle against corruption (Utkina, 2023). In Ukraine, government integrity and transparency are crucial in combating financial threats tied to corruption and enhancing the effectiveness of the existing national financial monitoring system and national security (Blahuta et al., 2023; Kuzmenko et al., 2023; Kuzior et al., 2022).

Corruption contributes to the unfair distribution of taxes. Taxpayers who can afford to "deal" with the tax authorities pay less than the law requires, while law-abiding citizens and companies pay more. This creates injustice and discourages taxpayers, reducing the level of voluntary tax payments. Tiganasu et al. (2022) reveal that high corruption undermines fiscal policy effectiveness, and Kaya (2023) finds that government actions (in bid for government contracts, applying for operating licenses and import licenses) during crises affect bribery prevalence. Linhartová and Pucek (2024) highlight corruption's indirect impact on living standards in transitional economies. Djouadi et al. (2024) suggest that it stimulates investment, especially when bureaucratic inefficiencies and strict regulations hinder investment efforts. Corruption can facilitate the acquisition of permits, licenses, and financing and help create a more predictable business environment. The study emphasizes that ensuring the rule of law, accountability, transparency, and reducing bureaucracy are particularly crucial issues.

Transparency and openness of governance are crucial for economic and social development. Thus, Gasimov et al. (2023) link governance openness and institutional quality to economic growth, and Vasylieva et al. (2023) show that public trust and transparency boost GDP and macro stability. Dobrovolska et al. (2024a) emphasize the importance of tax reforms in enhancing investment, innovation, and overall economic performance in Ukraine. Drăcea et al. (2024) propose that better governance and human development enhance budget transparency, which in turn improves governance. Bozhenko et al. (2023) emphasize a comprehensive approach to climate finance transparency to combat corruption in developing nations, while Xiao et al. (2024) find that transparency boosts short-term green fund performance.

As digitalization advances, its role in transparency and national security grows, making individuals more transparent and placing pressure on governments to open and digitize public services (Zámek & Zakharkina, 2024). Androniceanu (2023) and Alyaseri et al. (2024) call for structural reforms to reduce bureaucracy and increase public sector transparency, while Suhanyi et al. (2024) and Calisto et al. (2023) stress the value of digital communication with authorities to increasing the governance transparency. Virlanuta et al. (2024) provided evidence that the increased computerization and use of ICT in citizens' daily lives exert pressure on governments to expand and enhance the delivery of digitized public services, ensuring they are provided more efficiently and transparently. Amrani et al. (2022) present evidence that ICT has evolved beyond its managerial focus, now playing a crucial role in promoting good governance principles, particularly transparency and citizen participation.

Bureaucracy and corruption are prevalent issues across various sectors, including healthcare. Kolomiiets et al. (2023) and Dobrovolska et al. (2022) highlight transparency as essential for efficient healthcare and public safety. Waldman (2024) points to a common conflict between resource efficiency and quality care delivery in state-run healthcare. Awojobi and Adeniji (2023) discuss social health services transparency within a municipal policy framework.

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Combating corruption requires broad institutional reforms to shift public attitudes and foster zero tolerance, a key step toward rebuilding trust in government, particularly in Ukraine's context of increased social engagement amid wartime (Kuzior et al., 2023). Prati (2024) finds no consistent link between regime type (democratization or autocracy) and subjective well-being, while Pogorelov and Polishchuk (2024) emphasize the need to prioritize transparency to mitigate risks during and after the war. Kovbasyuk et al. (2024) project Ukraine's corruption levels for 2024–2027, while Dobrovolska et al. (2024b) demonstrate that business restrictions have the most substantial impact on the corruption control indicator in Ukraine, while judicial punishment of corrupt officials has an insignificant effect, attributed to the low number of actual final court decisions in corruption cases. Bozhenko et al. (2022) identify the tax burden, government spending, wages, and the rule of law as critical corruption influencers in Ukraine.

Many studies provide cross-sectional snapshots of transparency and corruption levels. There is a lack of comparative analyses between different Ukrainian regions and cities. Incorporating survey data offers a deeper understanding of the nuances in transparency and corruption interrelations.

The aim of this study is to examine how transparency in local governance influences the level of corruption in regional cities of Ukraine. Analyzing survey data from multiple Ukrainian cities investigates the relationship between the transparency of local authorities and the estimation of citizens' opinions about corruption and bribery in municipal services, healthcare, and other public sectors.

2. METHODS

The available data on Ukrainian cities formed a sample for the period 2017–2020. The sample included data from 24 cities in Ukraine. The selection of cities and period is not random and is based on the principle of maximum information content of the available data. The statistical basis for this analysis includes data from open sources, namely:

1) all-Ukrainian sociological municipal survey for 2017–2020 conducted by the International Republican Institute (IRI, n.d.);

2) data from the project 'Transparent, Financially Sound and Competitive Local Governments in Ukraine' for 2017–2020' (INEKO & ICPS, n.d.).

The selected cities and period overlap, allowing for a sample with the maximum possible input data. This ensures

1) representativeness of the study, as a larger number of inputs for panel regression analysis reduces the likelihood of inadequate results and the impact of possible errors;

2) comprehensiveness of the analysis, as different sources provide information on different aspects of the phenomenon under study and are not directly related to each other;

3) reliability of the results based on confirmed verification of data from the primary sources (both projects ensure an adequate and representative sample when conducting surveys).

Data on the indicators selected for the analysis are presented in Table 1.

For normalization, the logistic normalization formula, which considers emission-resistant indicators of the average trend of data change, is proposed. This approach is used in many data analysis and machine learning algorithms.

To examine the strength of influence of the independent indicators (Y_1-Y_{10}) on the dependent indicator (X), overall city transparency, the methods of panel regression with random and fixed effects are applied, and (X_1-X_{10}) are used. Panel regression is a statistical method that can analyze relationships between variables, considering changes over time and between different objects (Brüderl & Ludwig, 2015; Fitrianto & Musakkal, 2016). Fixed-effects panel regression is a type of panel regression that considers the influence of time-invariant factors specific to each observed object (Brüderl & Ludwig, 2015). Randomized-effects panel regression is another type of panel regression that considers the influence of

Table 1. Input data

Code of symbols	Indicator	Meas.	Source
	Independent variable		
X	Overall city transparency	%	INEKO and ICPS (n.d.)
	Dependent variables		
Y_1	Share of city residents who believe that the city mayor makes sufficient efforts to overcome corruption at the level of city government	%	IRI (n.d.)
	Percentage of city residents who have personally given a bribe or gift to these institutions in the last two years to solve their problem:		
Y_2	city government	%	IRI (n.d.)
Y_3	housing and communal services institutions	%	IRI (n.d.)
Y_4	registration and licensing institutions	%	IRI (n.d.)
Y_5	administrative service centers	%	IRI (n.d.)
	Percentage of city residents who have experienced one or more times in the last two years that they had to (were forced to or voluntarily) make a gift, give, or pay a bribe to representatives of these institutions to receive a service or document from them		
Y_6	local government	%	IRI (n.d.)
Y_8	medical institutions	%	IRI (n.d.)
Y_9	educational institutions	%	IRI (n.d.)
Y_{10}	the police, including the traffic police	%	IRI (n.d.)
Y_7	Frequency of occasions when one had to give a gift, bribe, or pay a bribe to local authorities to receive a service in the last two years	[0;3]	IRI (n.d.)
	Control variables		
X_1	Integrated index for assessing the city's capabilities	[0;5]	IRI (n.d.)
X_2	Integrated index for assessing the quality of services in the city	[0;5]	IRI (n.d.)
X_3	Index of the attitude of local authorities toward a person	[0;5]	IRI (n.d.)
X_4	Index of quality of services received	[0;5]	IRI (n.d.)
X_5	Index of simplicity and clarity of decisions and advice	[0;5]	IRI (n.d.)
X_6	Index of the level of knowledge of local authorities	[0;5]	IRI (n.d.)
X_7	Index of approval of the city mayor's performance	[0;3]	IRI (n.d.)
X_8	Index of approval of the performance of the executive committee of the city council	[0;3]	IRI (n.d.)
X_9	Index of approval of the city council's performance	[0;3]	IRI (n.d.)
X_{10}	Index of approval of the performance of communal services	[0;3]	IRI (n.d.)

time-invariant factors, but unlike fixed-effects, it treats these factors as random variables. This means that their variation is treated as random rather than deterministic, as in the case of fixed effects (Fitrianto & Musakkal, 2016). In general, panel regression is a powerful tool for data analysis, allowing for more accurate, reliable, and informative results than traditional regression methods (Brüderl & Ludwig, 2015; Fitrianto & Musakkal, 2016).

It was decided to consider the obtained values of the coefficients in the range of 5% and 10% of the *P* value.

3. RESULTS

After their normalization and the application of panel regression analysis, the available statistical data allowed calculations for each Y_1-Y_{10} for the entire sample of Ukrainian cities and the period of the study based on panel data models with randomized and fixed effects.

Table 2 presents a random effects panel regression model for the dependent variable Y_1 – the share of city residents who believe that the city mayor makes sufficient efforts to overcome corruption at the level of city government.

The estimated coefficient for the independent variable *X* is equal to (–0.1116658). This means that each additional value of X, i.e., an increase in the indicator "Overall City Transparency" by one point, reduces Y_1 by 0.1116658 points, while holding other variables constant. Similarly, for the control variables X_1-X_{10}, the coefficients on these variables show the impact of the respective variables on the dependent variable. The constant (Cons)

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Table 2. Random effects panel regression for the dependent variable Y_1

Y_1	Coefficient	Std. err.	Z	P > |z|	[95% conf. interval]	
X	−.1116658	.0881707	−1.27	0.205	−.2844772	.0611456
X_1	−.0417463	.0972941	−0.43	0.668	−.2324392	.1489465
X_2	−.0491224	.2008881	−0.24	0.807	−.4428558	.344611
X_3	−.1112464	.274582	−0.41	0.685	−.6494172	.4269245
X_4	.0861103	.3066815	0.28	0.779	−.5149745	.6871951
X_5	.4455164	.4072919	1.09	0.274	−.3527611	1.243794
X_6	−.4167046	.3693089	−1.13	0.259	−1.140537	.3071275
X_7	.7838367	.2105499	3.72	0.000	.3711664	1.196507
X_8	−.6768484	.4681545	−1.45	0.148	−1.594414	.2407175
X_9	.6232688	.5018508	1.24	0.214	−.3603407	1.606878
X_{10}	−.0827918	.116501	−0.71	0.477	−.3111297	.145546
Cons	.3172063	.1020555	3.11	0.002	.1171813	.5172314

value, which is 0.3172063, shows the expected value of Y_1 when all independent variables are equal to 0. The standard error (Std. err.) shows the degree of dispersion around the coefficient estimate. The value of the *z*-statistic is a statistical indicator that tests whether the coefficient is different from zero. The statistical measurement $P > |z|$ displays the *p*-value corresponding to the *z*-statistic. If the *p*-value is less than 0.1, the coefficient is significant. The "95% conf. Interval" indicator shows the confidence interval for the coefficient. A visual representation of confidence intervals is shown in Figure 1.

The model's *R*-squared values indicate that it explains 74.51% of the overall variation in the dependent variable, with 19.27% explained within groups and 84.20% between groups. The Wald test (chi2 = 104.75, $p < 0.001$) confirms the model's statistical significance, showing that at least one independent variable significantly affects *Y1*.

The scatter plot matrix visualizes correlations between variables, revealing strong positive, weak, or negative relationships, suggesting a complex data structure.

Further analysis covered 19 panel regressions for additional dependent variables (Y_2-Y_{10}). Table 3 presents these results, with significant independent variables impacting each outcome.

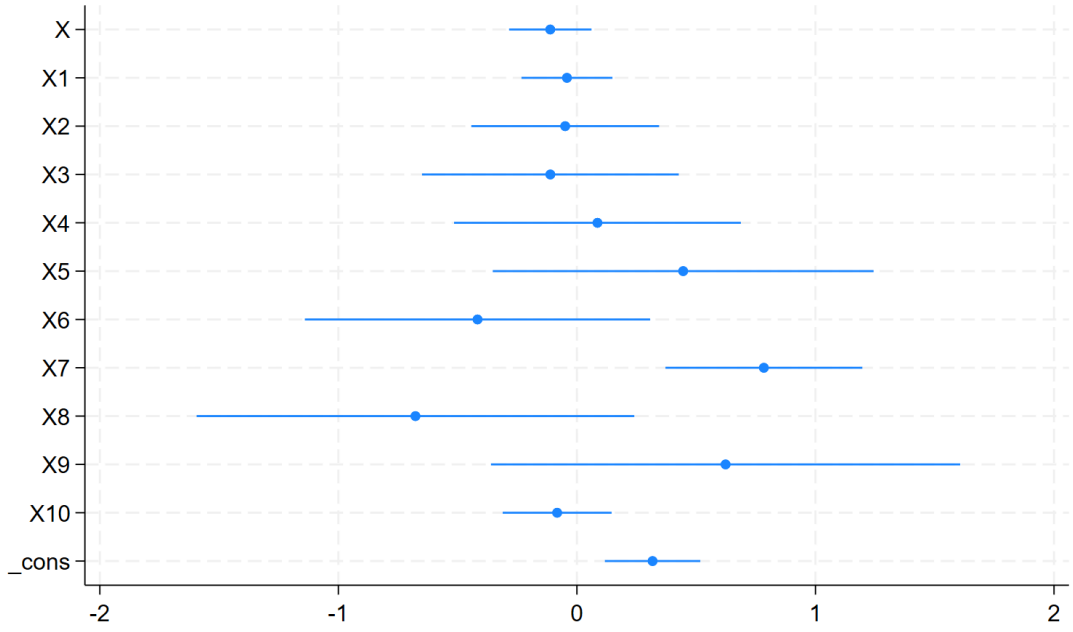

Figure 1. The confidence intervals for the panel regression coefficients

Table 3. Summary of independent variables whose influence was found to be significant

Dependent variable	Influencing independent variable	Value of impact	At what level of P-value	Model type
Y_1	X_7	0.7838367	0.000 ***	re
Y_2	X_1	0.3521929	0.014 **	re
Y_2	X_3	–0.7847508	0.052 *	re
Y_2	X_2	–1.158395	0.095 *	fe
Y_3	X	–0.2042226	0.075 *	re
Y_3	X_3	–1.05385	0.003 ***	re
Y_3	X_7	0.4674395	0.088 *	re
Y_3	X_{10}	–0.2576818	0.089 *	re
Y_4	X_3	–1.084581	0.019 **	re
Y_4	X	–0.5353756	0.095 *	fe
Y_4	X_2	–1.83418	0.011 **	fe
Y_5	X_1	–0.5957966	0.093 *	fe
Y_6	X	–0.2505674	0.064 *	re
Y_6	X_1	0.3510199	0.019 **	re
Y_6	X_6	1.932244	0.038 **	fe
Y_7	X_4	–1.526171	0.080 *	fe
Y_7	X_6	2.459348	0.029 **	fe
Y_7	X_7	–1.932672	0.093 *	fe
Y_8	X	–0.2032171	0.086 *	re
Y_8	X_1	0.3004324	0.021 **	re
Y_8	X_4	–0.817542	0.084 *	fe
Y_8	X_5	1.108311	0.084 *	fe
Y_9	X_1	.1543533	0.089 *	re
Y_9	X_5	.9370899	0.005 ***	re
Y_9	X_6	–.6080317	0.045 **	re
Y_9	X_4	–0.5031132	0.077 *	fe
Y_9	X_5	1.016505	0.010 ***	fe
Y_9	X_6	–0.5787407	0.096 *	fe
Y_{10}	X_3	–0.8391529	0.001 ***	re
Y_{10}	X_5	0.8398691	0.026 **	re

Note: fe is the fixed-effects panel regression, *re* is the randomized-effects panel regression, *** $p < 0.01$ (very high significance), ** $p < 0.05$ (high significance), * $p < 0.1$ (borderline significance).

Concerning Y_1 (belief in mayoral anti-corruption efforts), $X7$ (mayor's approval) shows a positive impact (0.78), suggesting residents with higher approval also believe more in anti-corruption efforts. For Y_2, X_1 (city capabilities index) positively correlates (0.35) with bribe frequency, implying higher-capacity cities may experience more bribery to resolve issues, aligning with the "grease the wheels" theory (Djouadi et al., 2024; Huntington, 1968). Additionally, a better perceived attitude of local authorities toward residents (X_3) decreases bribery (effect: –0.78), indicating that improved local–government attitudes help reduce corruption.

For Y3 (percentage of residents giving bribes in housing services), several factors were impactful:

1) with a coefficient of –0.204, greater city transparency (X) is linked to reduced bribery, suggesting transparency is a deterrent in this sector;

2) connected with a more positive attitude from local authorities (X_3) toward residents (coefficient: –1.05) also reduces bribery, indicating that supportive governance discourages corruption;

3) higher approval (coefficient: 0.47) for the mayor's performance (X_7) unexpectedly correlates with increased bribery in housing services; this may be due to citizens' increased engagement or frequent interaction with these services, possibly leading to bribery when services are inefficient or opaque, aligning with the "grease the wheels" theory;

4) a higher approval rating (coefficient: –0.26) for municipal services (X_{10}) correlates with lower bribery rates, suggesting satisfaction with these services may reflect attitudes toward corruption in municipal institutions.

According to Table 3, the level of bribery in administrative service centers (Y_5) is influenced by only one factor – X_1 (Integrated index for assessing the city's capabilities) with a coefficient of –0.5957966 (negative impact). There is a tendency for bribery at ASCs to decrease with the increase in the city's capability index. The higher the city's capability score, the lower the likelihood of bribery at ASCs. This may be because cities with better capabilities tend to have better administrative service delivery processes, which reduces the need for corrupt schemes.

The percentage of city residents who one or more times had to (were forced to or voluntarily) bribe the local government representatives (Y_6) is influenced by the following independent variables.

X_1 (Integrated index for assessing the city's capabilities), with a coefficient (0.3510199). This could be explained that increasing the share of city residents who have had experience of bribery acceler-

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ated by the city's capability index. Such result can be explained by the following:

- Residents may have higher expectations of the quality and speed of service delivery. When these expectations are not met due to bureaucratic obstacles or inefficiencies, people may resort to bribes to get the desired results.
- There is often competition for access to limited resources or services. This can lead people to resort to bribery to gain an advantage in accessing these resources, such as better working conditions, housing, or other benefits.
- Cities with a high capability index may offer more personal and professional growth opportunities. Still, they can also create situations where corruption becomes a tool to speed up processes or gain advantages.

X_6 (Index of the level of knowledge of local authorities) has a coefficient of 1.932244. As the level of knowledge increases, the proportion of city residents who have had bribery experience increases. Local authorities with a high level of knowledge may:

- Be more aware of the law and regulatory requirements, allowing them to use corruption schemes more carefully and effectively. This may mean that officials know how to minimize the risks of exposure or punishment, making bribery more common and safer for both parties.
- Introduce more complex procedures and regulations that, although aimed at improving governance, may make it more difficult for citizens to obtain services. This can create situations where residents are forced to resort to bribes to speed up or simplify the process.
- Demand higher bribes for their "services," understanding their importance and influence. Residents seeking to achieve their goals may be willing to pay more to resolve their issues through informal channels.
- Lead to more active engagement with citizens, for example, through improved services or new initiatives. This may increase the number of situations where residents face the possibility or necessity of paying bribes.

The frequency of bribing local authorities (Y_7) is influenced by the following independent variables: X_4 (Index of quality of services received), X_6 (Index of the level of knowledge of local authorities), and X_7 (Index of approval of the city mayor's performance), with a coefficient of –1.932672 (negative influence). There is a tendency for the frequency of bribery to decrease with increasing approval of the mayor's performance. This may be because trust in the mayor and his/her team leads to a decrease in corruption in general.

These calculations suggest that the level of bribery in healthcare facilities (Y_8) is influenced by X_5 (Index of simplicity and clarity of decisions and advice), with a coefficient of 1.108311 (positive influence). Paradoxically, as the index of simplicity and clarity of decisions and advice increases, the rate of bribery also increases. The clarity of decisions and advice can increase citizens' trust in local authorities, which in turn can increase demand for services. Increased demand can put pressure on the system, which encourages bribery to get things done quickly. This may be because residents are willing to pay for comfort and convenience.

Thus, the overall transparency of the city (X) affects the dependent variables (the level of bribery in different sectors) according to the results of the panel regression:

- Y_3 (Bribes in the housing and communal services sector) with a coefficient of –0.2042226 (negative influence) proved to be significant ($p < 0.1$).
- Y_4 (Bribes in registration and licensing institutions) with a coefficient of –0.5353756 (negative influence).
- Y_6 (Experience of bribing local authorities) with a coefficient of –0.2505674 (negative influence).
- Y_8 (Bribes in healthcare institutions) with a coefficient of –0.2032171 (negative influence).

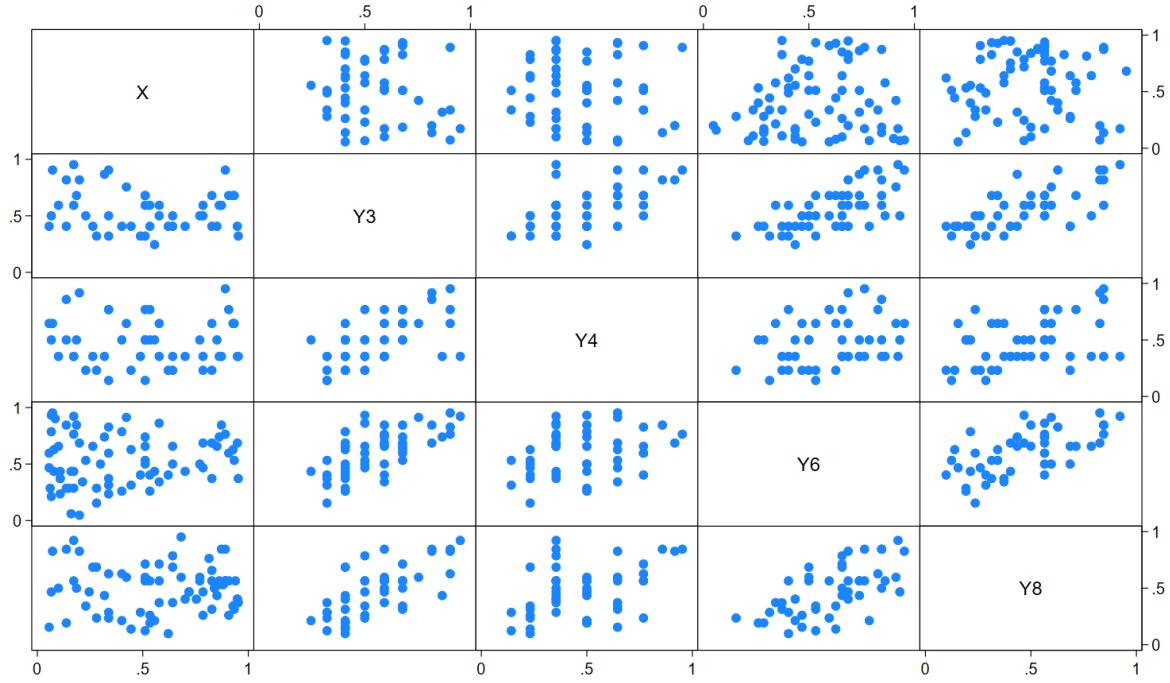

Figure 2. Scatter plot matrix X, Y_3, Y_4, Y_6, Y_8

This analysis shows that the overall transparency of the city has a negative impact on the level of bribery in various areas. This means that the more transparent the city authorities are, the less likely it is that residents will resort to bribery.

It should be noted that in most cases, the significance of the impact of city transparency is "borderline" ($p < 0.1$). This means there is a certain probability that the identified relationship is random.

Although the significance of the impact of city transparency is not always very high, the analysis results confirm this factor's importance in the fight against corruption. Increasing the transparency of local authorities should be one of the priorities of anti-corruption policy.

Figure 2 is a scatter plot matrix showing the correlation between the variable X and the variables Y_3, Y_4, Y_6, and Y_8. Each individual scatter plot illustrates the relationship between the X variable (abscissa) and one of the Y variables (ordinate).

Figure 2 clearly shows little or no correlation between X and Y_3; the points are scattered throughout the plane, and there is no clear upward or downward trend. Between X and Y_4, a positive correlation is evident, so as X increases, Y_4 tends to increase, although the points are not evenly distributed. Between X and Y_6, there is no correlation as the distribution of the points is random, with no clear relationship between the variables. X and Y_8 have a pronounced positive correlation, with an increase in X clearly showing an increase in Y_8.

The scatter plot matrix shows that the variable X has a different relationship with each of the Y variables. The most pronounced positive correlation is observed between X and Y_8, while X and Y_3 are practically unrelated. This indicates that different Y factors may have different effects on the X variable.

4. DISCUSSION

This study examines the correlation between transparency in local governance and corruption levels across multiple sectors within Ukrainian cities. Consistent with previous research, these findings indicate a significant negative association between transparency and corruption, particularly in sectors such as housing services, healthcare, and licensing institutions. This aligns with Vasylieva et al. (2023), who demonstrated that public trust, bolstered by transparency, enhances governance quality and reduces corrupt practices, contributing to macroeconomic stability.

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Notably, the study identifies transparency as crucial in diminishing bribery in various public sectors. For instance, regression models reveal that increased transparency is associated with a decline in corruption within housing services (coefficient = –0.204), registration and licensing institutions (–0.535), and healthcare (–0.203). These findings underscore that transparent governance practices foster accountability, a result echoed by Drăcea et al. (2024), who posit that enhanced governance and human development foster budget transparency and promote integrity in public service.

However, the results diverge from some literature by showing complex dynamics in the role of public approval for local governance. For example, high public approval for local governance and the mayor's performance (e.g., coefficient = 0.47 for housing services) correlated with increased bribery, a finding which may support the "grease the wheels" theory (Djouadi et al., 2024). This theory suggests that in certain institutional settings, citizens may still rely on bribery to bypass bureaucratic hurdles despite transparency improvements. This complexity highlights that transparency alone might not resolve all aspects of corruption and that its effectiveness may be limited in contexts with entrenched bureaucratic inefficiencies, as suggested by Linhartová and Halásková (2022), who found that regulatory quality and economic openness also significantly shape corruption dynamics.

Additionally, the outcomes suggest a paradox in settings where transparency is present but does not fully mitigate corruption, a nuance that previous studies may not have thoroughly explored. For example, higher city capability indices positively correlated with bribery in administrative service centers (coefficient = 0.35), hinting at an unintended consequence of governance enhancements, where citizens with higher expectations may turn to informal means when those expectations are unmet.

This study reinforces transparency's critical role in combatting corruption but also highlights that transparency is not a singular solution. The findings support Vasylieva et al. (2023) and Dobrovolska et al. (2024b), who argue that alongside transparency, regulatory reforms and digital solutions like e-governance can provide a more holistic approach to mitigating corruption. Future studies should further explore these dynamics, especially in transition economies like Ukraine, where corruption may manifest differently across sectors and governance frameworks.

The beginning of the full-scale Russian invasion of Ukraine led to the suspension of many public initiatives. Unfortunately, this also happened with the 'Transparent, Financially Sound and Competitive Local Governments in Ukraine' project for 2017–2020 (INEKO & ICPS, n.d.). In addition, the government's decision to stop publishing data in the public domain makes it impossible to conduct an assessment using the specified methodology, even based on the results of 2021. Therefore, the study used data for the entire available period 2017–2022.

Despite this, the obtained results will facilitate better use and reporting of financial aid from international donors in the budgetary sphere, which is critical during and after the war. As healthcare, licensing, and municipal services sectors are important now and will be essential in post-war recovery, ensuring continued transparency will help mitigate corruption and ensure that resources and services are distributed equitably. The results provide actionable insights for policymakers from other countries worldwide on prioritizing transparency measures in sectors with the most impact, directing their anti-corruption efforts efficiently. Countries aiming to meet or exceed transparency standards can use Ukraine's findings to assess their levels of public sector integrity and identify appropriate practices to prevent errors and ineffective solutions.

CONCLUSION

Corruption remains a significant barrier to effective governance and public trust in Ukraine, making transparency in local authorities an urgent priority. This study examined the impact of transparency on corruption levels across various public sectors in Ukrainian cities.

Using panel regression analysis on data from 24 Ukrainian cities, the study demonstrated the role of transparency in reducing corruption levels. The results indicated a clear negative correlation between transparency and bribery, with transparency proving particularly effective in reducing corruption in specific sectors. For instance, the analysis yielded transparency coefficients of –0.204 for municipal services, –0.535 for licensing institutions, and –0.203 for healthcare. These coefficients imply that higher levels of transparency in these sectors are associated with lower levels of bribery, suggesting that transparent governance practices provide a deterrent against corruption. This is particularly notable in healthcare, where transparency showed a stronger impact, likely due to the sector's direct impact on citizens' lives, which may intensify public scrutiny and place greater pressure on officials to maintain accountability.

However, the study also uncovered certain paradoxical findings. In some instances, higher levels of public approval for local governance (for instance, estimation of coefficient for city capabilities index – 0.35, integrated index for assessing the city's capabilities – 0.351, the mayor's performance – 0.47, etc.) correlated with an increased frequency of bribery. This unexpected result may reflect complex social dynamics or underlying factors not fully accounted for within the study's framework. One possible explanation is the "grease the wheels" theory, which posits that corruption may sometimes persist or even increase within weaker institutional settings, where it is used as a tool to navigate bureaucratic inefficiencies. This inconsistency suggests that while transparency is generally effective in curbing corruption, it may be insufficient on its own to address all forms of corrupt practices within local governance, especially in environments where institutional weaknesses persist.

These findings suggest that enhancing transparency can reduce corruption but may not suffice alone in complex institutional environments. Therefore, alongside transparency initiatives, additional measures, like regulatory reforms and digital solutions, are essential to comprehensively address and mitigate corruption at the local government level.

AUTHOR CONTRIBUTIONS

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